REMARKS

Claims 14-15 have been amended. No new claims have been added. No claims have been cancelled. Thus, claims 1-19 are pending.

Claims 1-2, 7, and 14-16 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Matsugu (U.S. Patent No. 6,463,176). Claims 1-16 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Fu (U.S. Patent No. 6,370,271). Claims 3-6 and 8-13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Matsugu. Claim 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Fu. Claim 17 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Fu and Hasuo (U.S. Patent No. 5,583,614). Claim 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Fu and Funada (U.S. Patent No. 5,257,119). These rejections are respectfully traversed.

Claim 1 recites:

> An image recognition device, comprising: ... a pattern detection means to detect relative positions of said plurality of input pattern elements compared with a multiple magnification reference arrangement data of said target pattern elements in order to recognize whether said input image includes said target pattern.

Claim 2 recites:

> An image recognition device, comprising: ... an arrangement data generating unit which stores the position data representing the arrangement of the target pattern elements at a plurality of magnifications; and a pattern detection unit, which based on the output of said element matching unit and said position data from said arrangement data generating unit, determines whether said target pattern can be found in said input image pattern data.

Claim 7 recites:

> An image processing device, comprising: ... a pattern detection means to detect relative positions of said plurality of input pattern elements compared with a reference arrangement data, at multiple magnifications, of said target pattern elements in order to recognize whether said input image includes said target pattern; ....

Claim 13 recites:

> A recording medium containing computer code for implementing an image recognition method, ... said computer code comprising: an element matching means to match a plurality of input pattern elements obtained by ... a pattern detection means to detect relative positions of said plurality of input pattern elements compared with a multiple magnification reference arrangement data of said target pattern elements in order to recognize whether said input image includes said target pattern.

Claim 14 recites:

> A method of processing an image ... comprising: ... determining reference arrangement data for said target pattern elements at a plurality of magnifications; ... and comparing said target pattern elements and said input elements.

Each of the independent claims recite a device, method, or recording medium for causing a computer to execute a method, for image processing. More specifically, each independent claim requires the associated device, method, or recording medium to generate or use multiple magnification reference data. That is, reference data which is used as a comparison against image data (for example, in pattern matching) is available at multiple magnification. In this manner, a more accurate determination of

whether a pattern exists in the image data, albeit at a different level of magnification, can be detected.

Matsugu discloses an image recognition system, including element and pattern recognition features. More specifically, Matsugu detects patterns by comparing the orientation of features with a single pattern. Matsugu compensates for different magnifications by scaling input, *i.e.*, image patterns to a plurality of scaling factors σ. Column 6, lines 9-14.

The Office Action argues that Matsugu specifically teaches "that the model array data (i.e., the reference data) is reduced or enlarged in dependence upon the scaling parameter (column 7, lines 46-48)." Office Action at page 2. It is respectfully asserted that this interpretation is incorrect. The portion (i.e., column 7, lines 46-48) cited by the Office Action is a fragment from a paragraph (column 7, line 42 – column 8, line 3) illustrating an example. The underlying method itself is described in part by a preceding paragraph, which states:

> In the first embodiment, recognition is executed at step S15 by matching the model array data and the data presenting the array of extracted feature elements generated from an actual image. ... An ordinary template matching technique may be used as processing for recognition after the encoding of the numerical values of the local feature elements. However, this technique differs from the conventional template based method in that the model array data does not rely upon the size of the image. More specifically, when the local feature elements are encoded from an image at the respective scaling parameters σ_1, σ_2, ... σ_n, and matching with model array data is performed, reduction or enlargement is carried out in such a manner that the lattice size of the model array will coincide with the lattice size of the data extracted from the actual image. Accordingly, it is unnecessary to prepare, for each different lattice size, model array data of the local feature elements of an image to be recognized.
>
> (column 7, lines 14 – 41) (emphasis supplied)

The above reproduced portion demonstrates that while Matsugu performs enlargement and reduction in order to match the lattice size of the image data with the model data, the enlargement and reduction are performed on the image data and not the model data, because "the model array data does not rely upon the size of the image" and "it is unnecessary to prepare, for each different lattice size, model array data." That is, there is no teaching or suggestion that Matsugu utilizes something other than a single sized model array data. Additionally, the example given at column 7, line 43 – column 8, line 3, Matsugu further discloses:

> For example, in the case of recognition of a facial image, model mask data of unchangeable size is created in advance by local feature elements such as L-type intersections and curve elements with regard to portions such as the eyes and mouth that are necessary for recognition, and model array data (which is reduced or enlarged in dependence upon the scaling parameter σ at the time the local feature elements are extracted) of unchangeable size possessing the relative positional relationship among the eyes and mouth is stored as a mask pattern, each area of the image after extraction of the local feature elements is scanned, and then the degree of matching with the model array data is computed on the basis of, say, an evaluation function of the degree of matching, described below.
>
> (column 7, lines 14-55)(emphasis supplied)

That is, Matsugu discloses that the its model array data is of a unchangeable size.

In contrast, the above recited claims compares the image data against multiple magnifications of reference arrangement data. That is, the claims require the use of model array data of multiple sizes. Matsugu therefore fails to disclose or suggest the use of the multiple magnification data as recited in each of the amended independent claims.

Fu also discloses an image recognition system, and like Matsugu, discloses the use of comparing input data to a single reference data. The input data provided to the

system of Fu is rescaled in size and reduced in color resolution, before compared with the single reference data. Column 6, lines 33-42.

The Office Action argues that Fu specifically teaches "multiple magnification reference data" at column 7, lines 47-56. Office Action at page 2. It is respectfully asserted that this interpretation is incorrect. The portion recited by the Office Action is corresponds to a method (Fig. 6) to be used with the apparatus (Fig. 5) of Fu. More specifically, the portion cited by the Office Action refers to an option for the circle checker (Fig. 5, circle checker 54) to be "scale invariant" and thus check using a plurality of rules in the structural rules data base (Fig. 5, database 53). The structural rules themselves, however, are merely rules and do not corresponds to the multiple magnification reference data. As is plainly illustrated in Fig. 5, the rules and the circle checker 54 are merely used to compile a feature list, while pattern matching is performed using the reference data from database 57 and the template matcher 56. The structural rules are in fact used with the input data to pre-process the input data before the reference data in database 57 is utilized by the template matcher 56 to detect patterns. Fu therefore also fails to disclose or suggest the use of multiple magnification data as recited in each of the independent claims.

Thus, neither Matsugu nor Fu discloses or suggests the use of multiple resolution pattern data for pattern identification. Accordingly, independent claims 1, 2, 7, 13, and 14 are believed to be allowable over the prior art of record.

The Office Action additionally cites to Hasuo and Funada. However, these references also fail to teach or disclose features corresponding to the above quote limitations of the independent claims. Accordingly, each of the depending claims, i.e., claims 3-6, 8-12, and 15-19 are also believed to be allowable over the prior art of record for at least the same reasons as the independent claims.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

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